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REMARKS

Claims 1-3 and 11-25 are all the claims presently pending in the application. Claim 25 is amended to more clearly define the invention. Claims 1 and 25 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicants also note that, notwithstanding any claim amendments herein or later during prosecution, Applicants' intent is to encompass equivalents of all claim elements.

Entry of this §1.116 Amendment is proper. Since the Amendments above narrow the issues for appeal and since such features and their distinctions over the prior art of record were discussed earlier, such amendments do not raise a new issue requiring a further search and/or consideration by the Examiner. As such, entry of this Amendment is believed proper and Applicant earnestly solicits entry. No new matter has been added.

Applicants gratefully acknowledge the Examiner's indication that claims 1-3 and 11-24 are allowed. However, Applicants respectfully submit that all of the claims are allowable.

Claim 25 stands rejected under 35 U.S.C. § 102(e) as being anticipated by the Takahashi et al. reference.

This rejection is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

An exemplary embodiment of the claimed invention, as defined by, for example, independent claim 25, is directed to a light emitting diode (LED) lamp that includes a package, a plurality of electrodes in an opening in the package, a red light emitting element bonded to a first electrode of the plurality of electrodes, a green light emitting element directly flip-chip bonded face down to the first electrode, and a blue light emitting element directly flip-chip bonded face down to the first electrode.

Conventional surface mount device package type light emitting diode lamps include light emitting diodes that are die bonded in an upper half region of a light emission surface and are wire bonded to leads in a lower half region. These conventional devices are limited by this arrangement in the amount by which the height may be reduced.

In stark contrast, an exemplary embodiment of the present invention provides a green

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light emitting element and a blue light emitting element that are flip-chip bonded face down to a first electrode of the plurality of electrodes. In this manner, the height of the package may be reduced because the opening in the package only needs to be large enough to receive the light emitting elements such that they do not contact each other and the lower half portion of the lamp may be omitted. (Page 5, lines 24- 28).

Further, flip-chip bonding the light emitting elements to an electrode obviates the necessity for wire bonding which further enables a reduction in the height of the lamp. (Page 5, line 29 – page 6, line 4).

II. THE PRIOR ART REJECTION

Regarding the rejection of claim 25, the Examiner alleges that the Takahashi et al. reference teaches the claimed invention. Applicants submit, however, that there are elements of the claimed invention which are neither taught nor suggested by the Takahashi et al. reference.

None of the applied references teaches or suggests the features of the claimed invention including a green light emitting element directly flip-chip bonded face down to a first electrode, and a blue light emitting element directly flip-chip bonded face down to the first electrode, as recited by independent claim 25. In other words, both of the green light emitting element and the blue light emitting element are directly flip chip bonded to the same (the first) electrode. As explained above, this feature is important for reducing the height of the package because the opening in the package only needs to be large enough to receive the light emitting elements such that they do not contact each other, because the lower half of the conventional lamp is obviated, and also because the amount of wire bonding is reduced.

In stark contrast, the Takahashi et al. reference discloses a lamp which includes a plurality of light emitting elements that are each mounted upon a sub-mount which is a Zener diode and that the Zener diode is mounted on an underlying electrode. The Takahashi et al. reference discloses flip-chip mounting some of the light emitting diodes to a Zener diode and then interconnecting the Zener diodes. These Zener diodes serve to protect the light emitting elements from abrupt voltage changes. (Col. 4, lines 13 – 20).

Indeed, in stark contrast to the present invention, the Takahashi et al. reference very specifically teaches away from mounting the light emitting elements on a same electrode to,

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among other things, improve heat sink performance. (See, for example, col. 3, lines 7-17).

Further, the light emitting elements that are disclosed by the Takahashi et al. reference are mounted upon a Zener diode which is then mounted on an underlying electrode. Thus, the light emitting elements are not directly flip-chip bonded to the electrode. Rather, the Zener diode is positioned between the electrodes and the light emitting elements.

Moreover, the lamp that is disclosed by the Takahashi et al. reference very clearly suffers from some of the problems which are solved by the present invention. The Takahashi et al. reference discloses a lamp which requires the use of wire bonding to connect the Zener diodes. The presence of these wire bonds limits the amount by which the height of the lamp may be reduced.

The Takahashi et al. reference clearly does not teach or suggest the features of the claimed invention including a green light emitting element and a blue light emitting element that are directly flip-chip bonded face down to a first electrode of the plurality of electrodes.

The Examiner cites column 13, lines 1-18 in an attempt to support the Examiner's allegation that the Takahashi et al. reference discloses a green light emitting element flip-chip bonded to a first electrode and a blue light emitting element flip-chip bonded to the first electrode.

The relevant portion of column 13, lines 1-18 of the Takahashi et al. reference merely states:

"The GaN-based green light-emitting elements G1, G2 and the blue light-emitting element B1 are connected to two electrodes provided on top of the Zener diodes ZD1, ZD2, and ZD3." (Emphasis added, col. 13, lines 3-6).

Thus, the Takahashi et al. reference does not teach or suggest that the green light emitting element and the blue light emitting element are directly flip-chip bonded down to the same (first) electrode.

This structure is illustrated by the Takahashi et al. reference in, for example, Figure 1A and Figure 5B. Figure 5B clearly illustrates that the light emitting element B1 is flip-chip bonded to a Zener diode ZD2. Figure 1A illustrates that each zener diode 103 includes two electrodes on its surface between the Zener diode 103 and a corresponding light emitting diode 102 that is flip-chip bonded to the Zener diode 103.

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Thus, the reference to "two electrodes provided on top of the Zener diodes ZD1, ZD2, and ZD3" is a clear reference to the two electrodes that are provided on top of EACH of these Zener diodes.

Further, the reference to the "The GaN-based green light-emitting elements G1, G2 and the blue light-emitting element B1 are connected to two electrodes" refers to the fact that each of these light emitting elements G1, G2, and B1 is connected to the two electrodes which are on the corresponding Zener diodes ZD1, ZD2, and ZD3, to which these elements are connected.

In other words, the light emitting elements G1, G2, and B1 which are disclosed by the Takahashi et al. reference at column 13, lines 1-18 to which the Examiner cites for support are not connected to the same electrode. Rather, and in stark contrast, each of these light emitting elements G1, G2, and B1 is connected to separate electrodes which are only provided on the surface of the corresponding Zener diode.

None of the light emitting elements G1, G2, and B1 is directly flip-chip bonded to the same electrode.

Thus, the Takahashi et al. reference does not teach or suggest the features of the claimed invention including a green light emitting element directly flip-chip bonded face down to a first electrode, and a blue light emitting element directly flip-chip bonded face down to the first electrode, as recited by independent claim 25.

Therefore, the Takahashi et al. reference does not teach or suggest each and every element of the claimed invention and the Examiner is respectfully requested to withdraw this rejection of claim 25.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 1-3 and 11-25, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

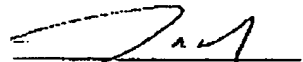
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CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that I am filing this Amendment Under 37 CFR §1.116 by facsimile with the United States Patent and Trademark Office to Examiner Joseph H. Nguyen, Group Art Unit 2815 at fax number (571) 273-8300 this 22nd day of February, 2007.


James E. Howard, Esq.
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